

Amendments to the Claims

The following listing of claims replaces all previous listings or versions thereof:

Listing of Claims:

Claims 1-63 (cancelled)

64. (currently amended) A photocurable adhesive composition consisting of, based on the total weight of the photopolymerizable monomers and/or oligomers of the composition:

15 to 60 wt% of at least one ~~non-aromatic mono-~~ or diacrylate monomer or oligomer thereof or a mixture of at least one non-aromatic diacrylate monomer[[s]] or oligomer thereof and at least one aromatic acrylate monomer[[s]] (A);

5 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof (B), bearing

at least one functional group
$$\begin{array}{c} \text{R}' \\ | \\ \text{---S---C---C=CH}_2 \\ || \\ \text{O} \end{array}$$
, in which R' is H or ---CH_3 ;

20 to 50 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof (C);

0% or 10 to 30 wt% of a monomethacrylate monomer (D); and

at least one photoinitiator;

with the proviso that the composition does not contain a brominated monofunctional acrylate.

65. (currently presented) The composition of claim 64, wherein:

(A) is at least 15 wt%;

(B) is at least 9 wt%; and

(C) is at least 25 wt%.

66. (currently amended) The composition of claim 64, wherein:

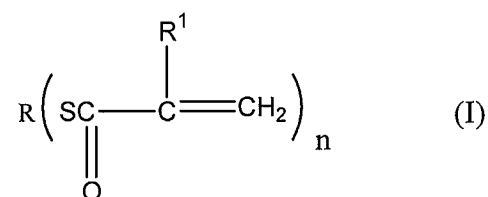
(A) is 20 to 60 wt% of at least one ~~mono-~~ or ~~poly~~ diacrylate monomer or oligomer thereof;

(B) is 20 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof and

- (C) is 20 to 40 wt% based on the total weight of the photopolymerizable composition of at least one aromatic dimethacrylate monomer or oligomer thereof.
67. (previously presented) The composition of claim 64, wherein (A) is 20 to 60 wt%, (B) is 30 to 50 wt% and (C) is 20 to 40 wt%.
68. (currently amended) The composition of claim 64, wherein:
(A) is 20 to 50 wt% of at least one ~~mono- or poly~~ diacrylate monomer or oligomer thereof;
(B) is 30 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and
(C) is 20 to 40 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof.
69. (currently amended) The composition of claim 64, consisting of:
20 to 40 wt% of at least one ~~mono- or poly~~ diacrylate monomer or oligomer thereof (A);
35 to 45 wt% of at least one thio(meth)acrylate monomer or oligomer thereof (B); and
25 to 35 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof (C).
70. (currently amended) The composition of claim 64, wherein said at least one ~~mono- or poly~~ diacrylate monomer (A) has a calculated solubility parameter ranging from 8 to 12 (cal/cm³)^{1/2}.
71. (currently amended) The composition of claim 70, wherein said at least one ~~mono- or poly~~ diacrylate monomer (A) has a calculated solubility parameter ranging from 8.5 to 11.5 (cal/cm³)^{1/2}.
72. (currently amended) The composition of claim 64, wherein said at least one ~~mono- or poly~~ diacrylate monomer (A) has a molecular weight < 500.
73. (currently amended) The composition of claim 72, wherein said at least one ~~mono- or poly~~ diacrylate monomer (A) has a molecular weight ≤ 350.
74. (previously presented) The composition of claim 64, wherein said at least one monomer (A) is a low refractive index monomer.

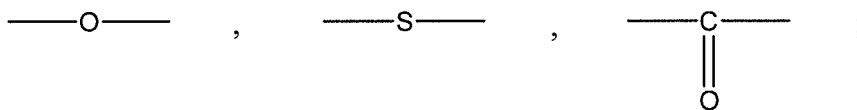
75. (cancelled)

76. (currently amended) The composition of claim 64, wherein monomer (A) is diethyleneglycol diacrylate, triethyleneglycol diacrylate, tetraethyleneglycol diacrylate, neopentylglycoldiacrylate, or 1,6-hexanediol diacrylate ~~or tetrahydrofurfuryl acrylate~~.
77. (previously presented) The composition of claim 64, wherein the at least one thio(meth)acrylate monomer (B) is a high refractive index monomer.
78. (previously presented) The composition of claim 64, wherein the at least one thio(meth)acrylate monomer (B) is a monomer of formula:



wherein:

R is a linear or branched, monovalent or polyvalent, aliphatic hydrocarbon radical, or a monovalent or polyvalent aromatic group directly linked to the sulfur atom of the thio(meth)acrylate group(s) through an aromatic ring or by means of a linear alkyl chain, the radical R may include in its chain one or more of:



R¹ is H or -CH₃; and

n is an integer from 1 to 6.

79. (previously presented) The composition of claim 64, wherein the at least one aromatic dimethacrylate monomer (C) is an ethoxylated bisphenol-A monomer.
80. (cancelled)
81. (previously presented) The composition of claim 64, wherein the photoinitiator represents 0.1 to 5 parts by weight for 100 parts by weight of the polymerizable monomers and/or oligomers.

82. (previously presented) The composition of claim 64, wherein, after curing, the adhesive composition has a refractive index of 1.53 to 1.65.

83. (withdrawn/amended) A process comprising:

providing a thermoplastic material substrate having at least one main surface;

providing a support having an internal surface bearing a coating and an external surface;

depositing on the main surface of the substrate or on the coating a pre-measured amount of a photocurable adhesive composition consisting of, based on total weight of photopolymerizable monomer and/or oligomers of the composition:

15 to 60 wt% of at least one ~~non-aromatic mono-~~ or diacrylate monomer or oligomer thereof or a mixture of at least one non-aromatic ~~mono-~~ or diacrylate monomer[[s]] or oligomer thereof and at least one aromatic acrylate monomer[[s,]] (A);

5 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer

thereof (B), and at least one functional group
$$\text{---S---}\overset{\text{R}'}{\underset{\text{O}}{\text{C}}}\text{---C=CH}_2$$
, in which R' is H or -CH₃;

20 to 50 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof, (C);

0% or 10 to 30 wt% of a monomethacrylate monomer (D); and

at least one photoinitiator;

with the proviso that the composition does not contain a brominated monofunctional acrylate;

moving relatively to each other the substrate and the support to either bring the coating into contact with the curable adhesive composition or bring the curable adhesive composition into contact with the main surface of the substrate;

applying a sufficient pressure onto the external surface of the support so that the thickness of a final adhesive layer, once the curable adhesive composition has cured is less than 100 μm ;

curing the layer of adhesive composition; and

withdrawing the support to recover a substrate with the coating adhered onto its main surface.

84. (withdrawn/amended) The process of claim 83, wherein:

~~(A) is at least 15 wt%;~~

(B) is at least 9 wt%; and

(C) is at least 25 wt%.

85. (withdrawn) The process of claim 83, wherein:

(A) is 20 to 60 wt% at least one mono or polyacrylate monomer or oligomer thereof;

(B) is 20 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and

(C) is 20 to 40 wt% based on the total weight of the photopolymerizable composition of at least one aromatic dimethacrylate monomer or oligomer thereof.

86. (withdrawn) The process of claim 83, wherein (A) is 20 to 60 wt%, (B) is 30 to 50 wt% and (C) is 20 to 40 wt% of (C).

87. (withdrawn) The process of claim 83, wherein:

(A) is 20 to 50 wt% of at least one mono or polyacrylate monomer or oligomer thereof;

(B) is 30 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and

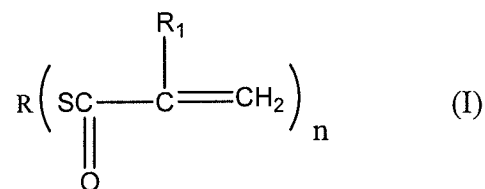
(C) is 20 to 40 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof.

88. (withdrawn) The process of claim 83, wherein:

(A) is 20 to 40 wt% of at least one mono or polyacrylate monomer or oligomer thereof;

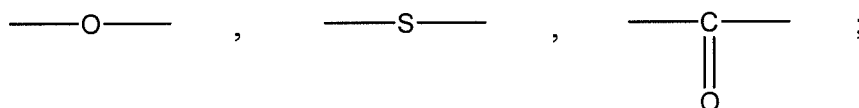
(B) is 35 to 45 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and

- (C) is 25 to 35 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof.
89. (withdrawn) The process of claim 83, wherein the thermoplastic material of the substrate is a high refractive index material.
90. (withdrawn) The process of claim 83, wherein the thermoplastic material of the substrate is polycarbonate.
91. (withdrawn) The process of claim 83, wherein said at least one mono or polyacrylate monomer (A) has a calculated solubility parameters ranging from 8 to 12 (cal/cm³)^{1/2}.
92. (withdrawn) The process of claim 91, wherein said at least one mono or polyacrylate monomer (A) has a calculated solubility parameter ranging from 8.5 to 11.5 (cal/cm³)^{1/2}.
93. (withdrawn) The process of claim 83, wherein said at least one mono or polyacrylate monomer (A) has a molecular weight < 500.
94. (withdrawn) The process of claim 93, wherein said at least one monomer (A) has a molecular weight ≤ 350.
95. (withdrawn) The process of claim 83, wherein said at least one monomer (A) is a low refractive index monomer.
96. (cancelled)
97. (withdrawn) The process of claim 83, wherein monomer (A) is diethyleneglycol diacrylate, triethyleneglycol diacrylate, tetraethyleneglycol diacrylate, neopentylglycoldiacrylate, 1,6-hexanediol diacrylate and tetrahydrofurfuryl acrylate.
98. (withdrawn) The process of claim 83, wherein the said at least one thio(meth)acrylate monomer (B) is a high refractive index monomer.
99. (withdrawn) The process of claim 83, wherein the at least one thio(meth)acrylate monomer (B) is a monomer of formula:



wherein:

R is a linear or branched, monovalent or polyvalent, aliphatic hydrocarbon radical, or a monovalent or polyvalent aromatic group directly linked to the sulfur atom of the thio(meth)acrylate group(s) through an aromatic ring or by means of a linear alkyl chain, the radical R may include in its chain one or more of:



R¹ is H or —CH₃; and

n is an integer from 1 to 6.

100. (withdrawn) The process of claim 99, wherein n is an integer from 1 to 3.
101. (withdrawn) The process of claim 83, wherein the at least one aromatic dimethacrylate monomer (C) is a ethoxylated bisphenol-A monomer.
102. (cancelled)
103. (withdrawn) The process of claim 83, wherein the photoinitiator represents 0.1 to 5 parts by weight for 100 parts by weight of the photopolymerizable monomers.
104. (withdrawn) The process of claim 83, wherein the substrate is a lens blank, and the main surface is a geometrically defined surface of the lens blank.
105. (withdrawn) The process of claim 104, wherein the support is made of polycarbonate.
106. (withdrawn) The process of claim 104, wherein the support is a flexible support part having an internal surface conformable to a geometrically defined surface of the lens blank when brought into contact therewith.

107. (withdrawn) The process of claim 106, wherein the flexible support is urged against the lens blank by means of an inflatable membrane.
108. (withdrawn) The process of claim 83, wherein the support is made of polycarbonate.
109. (withdrawn) The process of claim 83, wherein the support has a thickness of 0.3 to 1 mm.
110. (withdrawn) The process of claim 83, wherein the thickness of the final cured adhesive layer is less than 80 μm .
111. (withdrawn) The process of claim 83, wherein the thickness of the final cured adhesive layer is less than 50 μm .
112. (withdrawn) The process of claim 83, wherein the final cured adhesive layer has a refractive index of 1.53 to 1.65.
113. (withdrawn) The process of claim 83, wherein the exerted pressure ranges from 5 to 50 Psi (0.35 to 3.5 kgf/cm^3).
114. (withdrawn) The process of claim 83, wherein the coating comprises a hydrophobic top coat, an anti-reflective coating layer, an anti-abrasion coating layer, an impact resistant coating layer, a photochromic coating layer, a dying coating layer a polarized coating layer, a printed layer or a stack of two or more of these coating layers.
115. (withdrawn) The process of claim 114, wherein the coating has a thickness of 50 μm or less.
116. (withdrawn) The process of claim 83, wherein the substrate is a semi-finished lens having one face already provided with a coating.
117. (withdrawn) The process of claim 116, wherein the face already provided with a coating is the front face of the lens and the geometrically defined surface onto which the coating is transferred is the back surface of the lens.
118. (withdrawn/amended) A process which comprises:

providing a thermoplastic material substrate having at least one main surface;
providing a mold part having an internal surface and an external surface;
depositing on the main surface of the substrate or on the internal surface of the mold part
a pre-measured amount of a photocurable adhesive composition consisting of,
based on the total weight of photopolymerizable monomers and/or oligomers of
the composition:

15 to 60 wt% of at least one ~~non-aromatic mono-~~ or diacrylate monomer or
oligomer thereof or a mixture of at least one non-aromatic ~~mono-~~
diacrylate monomer[[s]] or oligomer thereof and at least one
aromatic acrylate monomer[[s,]] (A);

5 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer
thereof (B), and at last one functional group
$$\text{---S---}\overset{\text{R}'}{\underset{\text{O}}{\text{C}}}\text{---C=CH}_2$$
, in
which R' is H or ---CH_3 ;

20 to 50 wt% of at least on aromatic dimethacrylate monomer or oligomer
thereof, (C);

0% or 10 to 30 wt% of a monomethacrylate monomer (D); and

at least one photoinitiator;

with the proviso that the composition does not contain a brominated
monofunctional acrylate;

moving relatively to each other the substrate and the mold part to either bring the internal
surface of the mold part or the main surface of the substrate in contact with the
curable adhesive composition;

applying a sufficient pressure onto the external surface of the mold part to uniformly
spread the curable adhesive composition and form a uniform layer, which, when
cured, has a thickness of at least 200 μm .

curing the layer of adhesive composition; and

withdrawing the mold parts to recover the substrate overmolded with a cured layer of the curable adhesive composition.

119. (withdrawn/amended) The process of claim 118, wherein:

~~(A) is at least 15 wt%;~~

(B) is at least 9 wt%; and

(C) is at least 25 wt%.

120. (withdrawn) The process of claim 118, wherein:

(A) is 20 to 60 wt% at least one mono or polyacrylate monomer or oligomer thereof~~(A)~~;

(B) is 20 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof~~(B)~~;
and

(C) is 20 to 40 wt% based on the total weight of the photopolymerizable composition of at least one aromatic dimethacrylate monomer or oligomer thereof~~(C)~~.

121. (withdrawn/currently amended) The process of claim 120, wherein (A) is 20 to 60 wt% ~~of (A)~~, (B) is 30 to 50 wt% ~~of (B)~~ and (C) is 20 to 40 wt% ~~of (C)~~.

122. (withdrawn) The process of claim 118, wherein:

(A) is 20 to 50 wt% of at least one mono or polyacrylate monomer or oligomer thereof;

(B) is 30 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and

(C) is 20 to 40 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof.

123. (withdrawn) The process of claim 118, wherein:

(A) is 20 to 40 wt% of at least one mono or polyacrylate monomer or oligomer thereof;

(B) is 35 to 45 wt% of at least one thio(meth)acrylate monomer or oligomer thereof; and

(C) is 25 to 35 wt% of at least one aromatic dimethacrylate monomer or oligomer thereof.

124. (withdrawn) The process of claim 118, wherein a coating to be transferred is applied to the internal surface of the mold part before depositing the curable adhesive composition.

125. (withdrawn) The process of claim 118, wherein the overmolded cured layer of curable adhesive composition has a thickness of at least 500 μm .

126. (withdrawn/amended) A process comprising:

depositing a pre-measured amount of a photocurable adhesive composition on a main surface of a first part made of thermoplastic material;

bringing into contact the deposited photocurable adhesive composition with a main surface of a second part made of thermoplastic material;

pressing the first and second parts against each other to uniformly spread the photocurable adhesive composition to form a uniform thin layer; and photocuring the thin layer to obtain a laminated article, wherein the photocurable adhesive composition consists of, based on total weight of photopolymerizable monomers and/or oligomers of the composition:

15 to 60 wt% of at least one ~~non-aromatic mono- or~~ diacrylate monomer or oligomer thereof or a mixture of at least one non-aromatic ~~mono- or~~ diacrylate monomer[[s]] or oligomer thereof and at least one aromatic acrylate monomer[[s,]] (A);

5 to 50 wt% of at least one thio(meth)acrylate monomer or oligomer

thereof (B), and at last one functional group
$$\text{—S—}\overset{\text{R}'}{\underset{\text{O}}{\text{C}}}\text{—C=CH}_2$$
, in which R' is H or —CH_3 ;

20 to 50 wt% of at least on aromatic dimethacrylate monomer or oligomer thereof, (C);

0% or 10 to 30 wt% of a monomethacrylate monomer (D); and

at least one photoinitiator;

with the proviso that the composition does not contain a brominated monofunctional acrylate.

127. (withdrawn) The process of claim 126, wherein the article is an ophthalmic lens.

128. (previously presented) The photocurable adhesive composition of claim 64, wherein (D) is 10 to 30 wt% of a monomethacrylate monomer.
129. (previously presented) The photocurable adhesive composition of claim 64, wherein (D) is 10 to 30 wt% of a monomethacrylate monomer, and is further defined as an aromatic monomethacrylate monomer.
130. (currently amended) The photocurable adhesive composition of claim 64, wherein (A) is 15 to 60 wt% of at least one non-aromatic ~~mono- or~~ diacrylate monomer or oligomer thereof or a mixture of at least one non-aromatic ~~mono- or~~ diacrylate monomer[[s]] or oligomer[[s]] thereof and at least one aromatic monoacrylate monomer[[s]].
131. (currently amended) The photocurable adhesive composition of claim 64, wherein (A) is 15 to 60 wt% of at least one non-aromatic ~~mono- or~~ diacrylate monomer or oligomer thereof or a mixture of at least one non-aromatic ~~mono- or~~ diacrylate monomer[[s]] or oligomer[[s]] thereof and at least one aromatic monoacrylate monomers (A), and wherein (D) is a an aromatic monomethacrylate monomer.